during time periods simultaneous with mercury collection. Conditions were monitored at a height of 6 m at the Riegelwood sites and 20 meters at the Waccamaw site. Data were downloaded weekly by the site operator. The initial calibration was carried out by the manufacturer and performance and system audits carried out quarterly. Meteorological data were further validated after downloading at the laboratory using EPA guidance (USEPA, 1987).

Rainwater collection was performed consistent with guidance from the National Atmospheric Deposition Program (MDN). Weekly composite rainwater samples were collected using a modified Aerochem Metric sampler with a motor-activated lid that opened in response to precipitation events. All samples were retrieved using clean techniques and shipped to Frontier Geosciences for measurement of mercury using EPA Method 1631. Precipitation amount and temperature were recorded at the sites. Data are presented as cumulative wet deposition (ng/m^2) and volume-weighted mercury concentration (ng/L) for each weekly composite sample.

Estimated source mercury emission rates were compiled from the most recent available State of North Carolina air permit databases, unless more recent, reliable estimates could be found. Estimated emission quantities were verified against state air quality permits, whenever possible. Sources reporting annual releases less than 10 pounds were not included in this analysis.

RESULTS

Total Gaseous Mercury: TGM measurements at Waccamaw State Park are summarized in table 1 and presented graphically in figure 1. Data are derived from 15-minute average TGM measurements. Results from the Riegelwood Flynn and Ballpark data are presented in tables and figures 2 and 3, respectively. All Riegelwood data are generated from 5-minute average TGM concentrations.

Simultaneous on-site meteorological data are available for significant periods at all sampling locations. Figure 4 illustrates the relationship between wind direction and TGM readings at Lake Waccamaw for several time periods appearing in figure 1. Figures 5 and 6 present data from the Riegelwood sites.

Reactive Gaseous Mercury: Sampling for atmospheric RGM was conducted at the Riegelwood Ballpark site beginning in March of 2000. Figure 7 illustrates RGM and TGM levels recorded between March 7 and March 18. TGM values in figure 7 represent 2-hour averages, based on 24 consecutive 5-min periods. RGM values represent concurrent 2-hour average concentrations. Each sampling period was interrupted for 40 minutes for denuder desorption and RGM measurement.

Mercury in Rainwater: Data on mercury in rainwater collected from Pettigrew and Waccamaw State Parks for various periods between 1996 and 1999 are presented in table 4 and figures 8 and 9. All data in table 4 are based on annual figures. Volume-weighted average mercury concentration is calculated by dividing the annual sum of weekly deposition rates (ng/m^2) by annual precipitation (mm). Wet deposition data for 1999 are preliminary and have not been fully quality-assured by the MDN program office.